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Typed Name: Kevin D. McCarthy
Date: January 16, 2008

0-05-106 - 15524/US/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	Joshi et al.
Serial no.:	10/541,011
I.A. Filed:	December 29, 2003
Title:	ENHANCED GENERATION OF HYDROXYL RADICALS
Examiner:	Edna Wong
Art Unit:	1795

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

Response

This response is in reply to the office action mailed on October 12, 2007. Applicant includes a petition for a one month extension of time and the appropriate fee has been paid with the submission of this response.

Claim amendments

Please amend the claims as shown on the attached pages.

Beside formal amendments, partially requested by the Examiner, the following amendments have been effected:

The feature of "suspended" is supported, among others, at lines 25-26 on page 5 of the specification as originally filed.

The descriptive feature of synergic combination in step iii) of claim 1 is supported at lines 12-13 on page 5.

Claim Objections

Claim 1 was objected for two informalities, which have now been corrected, rendering the objection, in applicant's opinion, moot.

Claim Rejections – 35 USC § 112

Claims 1-2, 4-6 and 8-18 was rejected as failing to comply with the description requirement.

The Examiner suggested the phrase "as a catalyst suspended in liquid phase" is not sufficiently described in the specification, and she notes that no literal support for the words can be found.

The Examiner's attention is directed to lines 17-18 on page 4 of the specification. The medium, to which MgO is added and in which the generation of hydroxyl radicals occurs, is there defined as "aqueous mixture" being "an aqueous solution or suspension". Further, lines 24-26 on page 5 relate to MgO: "the solution is saturated with oxygen, and magnesium oxide in suspension is injected as a catalyst".

These and many other passages in the original specification clearly define, for a person skilled in art, MgO as a catalyst is suspended in liquid phase.

The current claim wording is supported in the specification sufficiently, clearly, and as closely to literal description as possible. MPEP advises (Chapter 2106, V. B. 1.) that the "claimed invention subject matter need not be described literally, i.e., using the same terms, in order to for the disclosure to satisfy the description requirement." The Examiner's proposals that the catalyst might be suspended on a support (her letter of 14 June 2007), or her allegation in her last letter that a skilled artisan would not know that MgO was suspended in liquid phase, violate (a) the MPEP's above-identified guidelines, and (b) the antecedent basis (i) set forth in the specification and (ii) explicitly addressed in this office action. It is respectfully requested the Examiner reconsider this rejection based on the above-identified facts and the amendment to claim 1.

Claims 11-18 were also rejected as failing to distinctly claim the subject matter, in view of non-clarities in claims 11, 17, and 18. The unclear points have been corrected as requested by the Examiner. The rejections are believed to be moot.

Claim Rejections – 35 USC § 103

The Examiner rejected prior claims 1-17 as being unpatentable over CS 274995 (the '995 reference) in combination with US 6,793,903 (Parrish).

It is shown below that the invention as now defined in the amended claims would not have been obvious in view of the cited documents; there was no reasonable expectation of success, and further the prior art references did not teach or suggest all the claim limitations of the instant claims [MEPM 706.02(j) (D)].

The '995 reference relates to processing industrial waters containing organic compounds capable to form strong complexes with metal ions [page 1, paragraph 3], particularly problematic are wash waters from galvanic bathes [page 1, paragraph 4]. The publication discloses a method for a photocatalytic degradation of the complexing agent, such as EDTA, by partly reacting said agent with iron or copper or nickel, thus producing an organic metalo-complex catalyst, such as Fe-EDTA. Ions Fe^{+2} or other ions are added but it is known that they are chelated in the complexes.

Parrish discloses a high temperature formation of radicals from hydrogen peroxide on a hot surface having a temperature of 200-500°C; the created radicals destroy the target (nitric oxide) in a gas-phase reaction [lines 16-17 at column 2]. Preferably, the hot surface is coated with iron ions, chromium ions, platinum black, silver, palladium, or glass, or oxides, such as MgO [lines 20-35 at column3]. Iron oxide gave the best results, several other catalysts comprising silver and ruthenium were also good [lines 40-53 at column 3], but the method works also without any catalysts [lines 35-38 at column 3].

The Examiner suggests (bridging pages 3-4) that the photocatalyst disclosed in the '955 reference might have been modified by the catalyst of Parrish; namely, Fe^{+2} and Cu^{2+} is suggested by the Examiner to be substituted by MgO of Parrish. However, when combining iron ions, chromium ions, platinum black, silver, palladium, glass, and MgO with organic Fe-EDTA complex, neither modification nor substitution can provide at the end MgO. If substituting Fe in Fe-EDTA by Mg, and EDTA by O, MgO might have been obtained but no success would be expected with such a strange combination. The '955 reference teaches its catalyst is an organic complex or metallic ion (depending on the interpretation), Parrish teaches its catalyst

is totally irrelevant because the high temperature is the key element regardless of whether the surface has a catalytic coating or not [lines 35-38 at column 3]. The instant invention teaches neither organic complex nor metal ions, nor irrelevant oxide surface, but a highly relevant inorganic - nonionic - suspended MgO, which is important as synergistically working with other factors.

The Examiner supposes [second paragraph on page 4] that there is no reason why the modification of the method of CS '995 with Parrish would not have generated hydroxyl radicals, producing aqueous biocidal environment. This assumption seems incorrect. A skilled person is automatically supposed to select MgO from many suggested, and more preferred materials in Parrish; if there is no reason for MgO and EDTA not to create hydroxyl radicals, one wonders why glass or platinum black of Parrish would not create the radicals too. But there is one principal reason for a person skilled in art not to select MgO from many Parrish's recited materials, it is known that MgO cannot exist side by side with the complexing agents, such as EDTA, of '995; a skilled person is aware of the fact that minor amounts of MgO would have been immediately sequestered by the EDTA which is in molar excess over the catalytic metals (see the abstract of '995), Mg would become a part of Mg-EDTA complex – no MgO would exist there any more.

Consequently, the Examiner's assumption on page 5 (third paragraph) is also incorrect:

> "Since MgO does not exist as ions, the substitution of the Fe^{+2} and Cu^{2+} disclosed by CS '955 with the MgO disclosed by Parrish would have made a MgO suspended in liquid phase."

As explained above, MgO would never be suspended in liquid phase under any conditions considered in CS '995 – it is clear that MgO would immediately dissolve to form a soluble complex.

The applicant agrees with the Examiner that the preferred embodiment does not constitute a teaching away from a non-preferred embodiment [the last two lines on page 6]. However, the applicant believes when combining two teachings, there should be at least some overlap or some common points between the two inventions placing them to the same or similar technological field.

The fact is that the '995 reference does not claim hydrogen peroxide [line 6 on page 4] and does not exemplify it in 8 of 10 experimental examples, the critical features relating to the reaction comprise:

> an excess of complexing compound,
> iron or copper or nickel ions in an amount of 17 mg/l or more,
> UV, and
> oxygen.

Parrish's critical features relating to the reaction comprise:

> nitric oxide,
> hydrogen peroxide, and

high temperature (lines 37-38 at column 3).

The instant invention is characterized by a reaction comprising:
oxygen
magnesium oxide
UV, and
hydrogen peroxide.

No overlap can be seen between the two teachings, and even if adding MgO to Parrish as a taught possibility, it is difficult even in hindsight to combine the features from the two sources so as to come close to the instant invention.

The Examiner rejects claim 18 as being unpatentable over CS 274995 ('995) in combination with US 6,793,903 (Parrish) and in view of DD 51638.

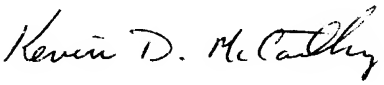
Since claim 18 depends from claim 17 and indirectly from claim 1, which both are now believed to be non-obvious, also claim 18 is believed to be non-obvious.

Conclusion

In the above notes it has been shown that combining the techniques from the two cited documents would have been technologically hardly possible; the two documents employ rather incompatible conditions, including high temperature versus UV, low versus high peroxide concentration, obligatory versus optional catalyst, liquid versus gas phase for the reaction, etc.; however, even an apparently probable integration of the two method, as suggested by the Examiner, namely modifying/replacing the CS '995 catalyst by Parrish's one, has been shown as impossible because the addition of MgO of Parrish into complexing solution of CS '995 would lead to the dissolution and sequestration of said MgO. If MgO disappears, no resemblance remains with the instant invention either.

The Applicant respectfully submits that, following the amendments of the claims, and in light of the above explanations, the instant application should be held allowable.

Respectfully submitted



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